

Worksheet A: Standard Application Process

Calculating Pollutant Removal Requirements¹

Step 1: Calculate Existing and Proposed Site Imperviousness
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A. Calculate Percent Imperviousness

- 1) Site Area within the Critical Area IDA, A = _____ acres
- 2) Site Impervious Surface Area, Existing and Proposed, (See Table 4.1 for details)

	(a) Existing (acres)	(b) Proposed (acres)
Roads	_____	_____
Parking lots	_____	_____
Driveways	_____	_____
Sidewalks/paths	_____	_____
Rooftops	_____	_____
Decks	_____	_____
Swimming pools/ponds	_____	_____
Other	_____	_____
Impervious Surface Area	_____	_____

- 3) Imperviousness (I)

Existing Imperviousness, I_{pre} = Impervious Surface Area / Site Area
= (Step 2a) / (Step 1)
= (_____) / (_____)
= _____ %

Proposed Imperviousness, I_{post} = Impervious Surface Area / Site Area
= (Step 2b) / (Step 1)
= (_____) / (_____)
= _____ %

B. Define Development Category (circle)

- 1) New Development: Existing imperviousness less than 15% I (Go to Step 2A)
- 2) Redevelopment: Existing imperviousness of 15% I or more (Go to Step 2B)
- 3) Single Lot Residential Development: Single lot being developed or improved; single family residential development; and more than 250 square feet of impervious area and associated disturbance (Go to Section 5, Residential Approach, for detailed criteria and requirements).

¹ NOTE: All acreage used in this worksheet refers to areas within the IDA of the Critical Area only.

Step 2: Calculate the Predevelopment Load (L_{pre})**A. New Development**

$$\begin{aligned} L_{pre} &= (0.5) (A) \\ &= (0.5) (\rule{1.5cm}{0.4pt}) \\ &= \rule{1.5cm}{0.4pt} \text{ lbs /year of total phosphorus} \end{aligned}$$

Where:

$$\begin{aligned} L_{pre} &= \text{Average annual load of total phosphorus exported from the site prior to development (lbs/year)} \\ 0.5 &= \text{Annual total phosphorus load from undeveloped lands (lbs/acre/year)} \\ A &= \text{Area of the site within the Critical Area IDA (acres)} \end{aligned}$$

B. Redevelopment

$$\begin{aligned} L_{pre} &= (R_v) (C) (A) (8.16) \\ R_v &= 0.05 + 0.009 (I_{pre}) \\ &= 0.05 + 0.009 (\rule{1.5cm}{0.4pt}) = \rule{1.5cm}{0.4pt} \\ L_{pre} &= (\rule{1.5cm}{0.4pt}) (\rule{1.5cm}{0.4pt}) (\rule{1.5cm}{0.4pt}) (8.16) \\ &= \rule{1.5cm}{0.4pt} \text{ lbs/year of total phosphorus} \end{aligned}$$

Where:

$$\begin{aligned} L_{pre} &= \text{Average annual load of total phosphorus exported from the site prior to development (lbs/year)} \\ R_v &= \text{Runoff coefficient, which expresses the fraction of rainfall which is converted into runoff} \\ I_{pre} &= \text{Pre-development (existing) site imperviousness (i.e., } I = 75 \text{ if site is 75\% impervious)} \\ C &= \text{Flow-weighted mean concentration of the pollutant (total phosphorus) in urban runoff (mg/l) = 0.30 mg/l} \\ A &= \text{Area of the site within the Critical Area IDA (acres)} \\ 8.16 &= \text{Includes regional constants and unit conversion factors} \end{aligned}$$

Step 3: Calculate the Post-Development Load (L_{post})**A. New Development and Redevelopment:**

$$L_{\text{post}} = (R_v) (C) (A) (8.16)$$

$$R_v = 0.05 + 0.009 (I_{\text{post}})$$

$$= 0.05 + 0.009 (\text{_____}) = \text{_____}$$

$$L_{\text{post}} = (\text{_____}) (\text{_____}) (\text{_____}) (8.16)$$

$$= \text{_____ lbs/year of total phosphorus}$$

Where:

L_{post} = Average annual load of total phosphorus exported from the post-development site (lbs/year)

R_v = Runoff coefficient, which expresses the fraction of rainfall which is converted into runoff

I_{post} = Post-development (proposed) site imperviousness (i.e., $I = 75$ if site is 75% impervious)

C = Flow-weighted mean concentration of the pollutant (total phosphorus) in urban runoff (mg/l) = 0.30 mg/l

A = Area of the site within the Critical Area IDA (acres)

8.16 = Includes regional constants and unit conversion factors

Step 4: Calculate the Pollutant Removal Requirement (RR)

$$RR = L_{\text{post}} - (0.9) (L_{\text{pre}})$$

$$= (\text{_____}) - (0.9) (\text{_____})$$

$$= \text{_____ lbs/year of total phosphorus}$$

Where:

RR = Pollutant removal requirement (lbs/year)

L_{post} = Average annual load of total phosphorus exported from the post-development site (lbs/year)

L_{pre} = Average annual load of total phosphorus exported from the site prior to development (lbs/year)

Step 5: Identify Feasible BMP(s)

Select BMP Options using the screening matrices provided in the Chapter 4 of the 2000 Maryland Stormwater Design Manual. Calculate the load removed for each option.

BMP Type	(L_{post})	x	(BMP_{RE})	x	(% DA Served)	=	LR
_____	_____	x	_____	x	_____	=	_____ lbs/year
_____	_____	x	_____	x	_____	=	_____ lbs/year
_____	_____	x	_____	x	_____	=	_____ lbs/year
_____	_____	x	_____	x	_____	=	_____ lbs/year
Load Removed, LR (total) =							_____ lbs/year
Pollutant Removal Requirement, RR (from Step 4) =							_____ lbs/year

Where:

Load Removed, LR	=	Annual total phosphorus load removed by the proposed BMP (lbs/year)
L_{post}	=	Average annual load of total phosphorus exported from the post-development site (lbs/year)
BMP_{RE}	=	BMP removal efficiency for total phosphorus, Table 4.8 (%)
% DA Served	=	Fraction of the site area within the critical area IDA served by the BMP (%)
RR	=	Pollutant removal requirement (lbs/year)

If the Load Removed is equal to or greater than the Pollutant Removal Requirement computed in Step 4, then the on-site BMP complies with the 10% Rule.

Has the RR (pollutant removal requirement) been met? ☐ Yes ☐ No